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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/047,556	10/23/2001	Martin Klein	H 2182	4171
1218	7590	02/07/2006	EXAMINER	
CASELLA & HESPOS 274 MADISON AVENUE NEW YORK, NY 10016			LEE, SHUN K	
			ART UNIT	PAPER NUMBER
			2884	

DATE MAILED: 02/07/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/047,556

Applicant(s)

KLEIN ET AL.

Examiner

Shun Lee

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 October 2005 and 12 December 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3, 5, 6 and 8-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 5, 6 and 8-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 May 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114 was filed in this application after appeal to the Board of Patent Appeals and Interferences, but prior to a decision on the appeal. Since this application is eligible for continued examination under 37 CFR 1.114 and the fee set forth in 37 CFR 1.17(e) has been timely paid, the appeal has been withdrawn pursuant to 37 CFR 1.114 and prosecution in this application has been reopened pursuant to 37 CFR 1.114. Applicant's submission filed on 12 December 2005 has been entered.

Interview Record

2. Applicant indicates (fifth paragraph on pg. 7 of remarks filed 12 December 2005) that " ... all of the claims in the subject application relate to converter devices disposed in a cascaded array". This should probably be most of the claims in the subject application relate to converter devices disposed in a cascaded array (see claims 11 and 12).

Priority

3. Acknowledgment is made of applicant's claim for foreign priority based on an application filed in Europe on 24 October 2000. It is noted, however, that applicant has not filed a certified copy of the 00 122 360.1-2208 application as required by 35 U.S.C. 119(b).

Specification

4. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Objections

5. Claims 1, 2, 5, 13, and 16 are objected to because of the following informalities:

- (a) in claim 1, "the respective converter device" on line 14 should probably be --each said converter device--;
- (b) in claim 1, "the converter device" on line 19 should probably be --each said converter device--;
- (c) in claim 1, "the converter device" on line 21 should probably be --each said converter device--;
- (d) in claim 2, "the converter device" on lines 1-2 should probably be --each said converter device--;
- (e) in claim 5, "the converter device" on line 2 should probably be --each said converter device--;
- (f) in claim 13, "said single insulator layer" on line 6 should probably be --each said insulator layer--;
- (g) in claim 16, "detector" on line 1 should probably be --converter device--; and
- (h) in claim 16, "each of said converter devices" on line 2 should probably be --said converter device--.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 11 and 16 are rejected under 35 U.S.C. 102(b) as being anticipated by Sauli (US 6,011,265).

In regard to claim **11**, Sauli discloses (Fig. 10) a converter device for a detector for detecting electrically neutral particles (column 1, lines 7-10), the converter device having an insulator layer (10) with opposite first and second surfaces, a first conductive layer (11) and a second conductive layer (12) disposed respectively on the first and second opposite surfaces of the insulator layer (10) such that the first (11) and second (12) conductive layers are electrically insulated from one another by the insulator layer (10) arranged between them, and at least one solid converter layer (PhC) which is arranged on at least one of the first conductive layer (11) and the second conductive layer (12), the converter device having a multiplicity of passages (1_i) for electrically charged particles (column 21, lines 27-31).

In regard to claim **16** which is dependent on claim 11, Sauli also discloses (Fig. 10) that the insulator layer (10) in each of said converter devices is the only insulator layer thereof.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

10. Claims 1-3, 5, 6, 8, 9, 10, 13-15, 17, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sauli (US 6,011,265) in view of Danielsson *et al.* (US 6,429,578) and Gleason (US 3,956,654).

In regard to claims **1**, **2**, **8**, and **15**, Sauli is applied as in claims 11 and 16 above. Sauli also discloses (Fig. 10) a detector for detecting electrically neutral particles, having

(a) a detector housing (*i.e.*, vessel; column 20, line 63 to column 21, line 2) which at least in certain regions is filled with a counting gas,

- (b) at least one readout device (ST_i , ST_j , RA, CA, A) for detecting (column 21, lines 44-57) the electrically charged particles; and
- (c) at least one electrical drift field device (B_1 , B_2 , B_3) for generating an electrical drift field for the electrically charged particles in at least a region of the volume of the counting gas in such a manner that at least some of the electrically charged particles drift toward the readout device (ST_i , ST_j , RA, CA, A), the first conductive layer (11) and the second conductive layer (12) are electrically connected to a device (B_2) for generating a converter field, the converter device being of charge-transparent design (*i.e.*, bored-through holes; column 21, lines 18-39) and being arranged in the detector housing in such a manner that the drift field (E') passes through at least part of the converter device, the converter device for generating conversion products as a result of the absorption of the neutral particles which are to be detected wherein the conversion products generate electrically charged particles (*e.g.*, electrons; column 22, lines 53-59) in the counting gas.

The detector of Sauli lacks an explicit description that a multiplicity of the converter devices are arranged in cascade form in the detector housing for generating conversion products. However, Danielsson *et al.* teach (column 4, lines 11-53) to provide a multiplicity of the converter devices arranged in cascade form, in order to discriminate between low and high energies. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to provide a multiplicity of the converter devices arranged in cascade form in the detector of Sauli, in order to discriminate between low and high energies.

In regard to claim **3** which is dependent on claim 2, Sauli also discloses (Fig. 4f; Tables 1 and 3) diameters D of for example, 110 μm and 130 μm (*i.e.*, a minimum diameter of between 10 μm and 1000 μm), and a minimum spacing P of 140 μm to 200 μm (*i.e.*, a minimum spacing of 10 μm to 500 μm).

In regard to claim **5** which is dependent on claim 1, Sauli also discloses (Fig. 10) that a region of the converter device which is active in the conversion is arranged substantially perpendicularly in the drift field (E').

In regard to claim **6** which is dependent on claim 1, Sauli also discloses (Fig. 10) that the device for generating a drift field has a structured drift electrode (11, 12) to generate the drift field between the drift electrode (11, 12) and the readout device (ST_i, ST_j, RA, CA, A).

In regard to claim **9** which is dependent on claim 8, while Sauli also discloses (column 1, lines 9-11) that the present invention relates to an improved technique for embodying a radiation detector of very high performance that can be used for detecting in position ionizing radiations such as charged particles, photons, X-rays and neutrons, the detector of Sauli lacks an explicit description that the converter layer is a neutron converter layer which contains at least one of lithium-6, boron-10, gadolinium-155, gadolinium-157 and uranium-235. However, neutron converter layers are well known in the art. For example, Gleason teaches (column 1, lines 9-36) that boron-10 is a widely used converter layer for detecting neutrons. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to provide boron-10 for the converter layer in the detector of Sauli, in order to detect neutrons.

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In regard to claim **10** which is dependent on claim 9, Sauli also discloses (column 9, line 32 to column 10, line 8) that the first and second conductive layers have a layer thickness (s as illustrated in Figs. 4c-4f and in Table I-III) of e.g., 15 μm (*i.e.*, from 0.1 μm to 20 μm) and the insulator layer has a layer thickness (T as illustrated in Figs. 4c-4f and in Table I-III) of 50 μm (*i.e.*, from 10 μm to 500 μm). The detector of Sauli lacks that the neutron converter layer has a 0.5 μm and 3 μm layer thickness. However, neutron converter layers are well known in the art. For example, Gleason teaches (column 1, lines 9-36) that a neutron converter layer comprises an absorptive coating of a material having a high neutron cross-section such as boron-10. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to optimize the thickness (e.g., from 0.5 μm and 3 μm) of a boron-10 absorptive coating as the converter layer in the detector of Sauli, in order to detect neutrons with a desired efficiency.

In regard to claims **13** and **17**, the method steps are implicit for the modified apparatus of Sauli since the structure is the same as the applicant's apparatus of claims 1, 2, 8, and 15.

In regard to claims **14** and **18**, the method steps are implicit for the modified apparatus of Sauli since the structure is the same as the applicant's apparatus of claims 1, 2, 8, and 15.

11. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sauli (US 6,011,265) in view of Gleason (US 3,956,654).

In regard to claim **12** which is dependent on claim 11, Gleason is applied as in claim 9 above.

Response to Arguments

12. Applicant's arguments filed 12 December 2005 have been fully considered but they are not persuasive.

Applicant argues (second paragraph on pg. 9 of remarks filed 12 December 2005) that Danielsson *et al.* require a different potential to exist between the metallic layer of each GEM structure 304 and the adjacent metallic converter 302. Examiner respectfully disagrees. Danielsson *et al.* state (column 14, lines 1-7) that "11. The detector as claimed in claim 1, wherein said converter and said amplifier are integrated in one unit by the provision of a composite dipole layered structure comprising a sheet of an insulating material which is metal clad on both sides, wherein at least one of said metal claddings is substantially thicker than the sheet of insulating material, said thicker metal cladding acting as a converter". Thus Danielsson *et al.* expressly teach that a different potential is not required between the metallic layer of each GEM structure 304 and the adjacent metallic converter 302.

Applicant argues (first two paragraphs on pg. 10 of remarks filed 12 December 2005) that Danielsson *et al.* teach not to use a Sauli-like GEM, and points out that the composite layered structure shown in FIGS. 7a and 7b has advantages over such a GEM. Examiner respectfully disagrees. As discussed above, Danielsson *et al.* teach an integrated converter and amplifier which is different from the composite layered structure shown in FIGS. 7a and 7b.

Applicant argues (first two paragraphs on pg. 11 of remarks filed 12 December 2005) that any further converter layer after the first GEM in Sauli would be useless since the first GEM have zero optical transparency. Examiner respectfully disagrees. Sauli states (column 23, lines 23-35) that "A fundamental property of the radiation detector for photons either as single stage or multistage version, which cannot be obtained with any other known gas detector, is that secondary photons produced during the electron avalanche process, both primary in the bored-through holes forming each electric field condensing area of the gas electron multiplier and secondary in the second stage element, cannot heat the photocathode layer PhC thereby preventing to induce secondary emission. The high dipole field which is created within the bored-through holes allow thus to obtain a collection efficiency, i.e. electrical transparency close to unity with an optical transparency close to zero". The key phrase is "secondary photons". Thus within Sauli, there is no teaching away of further converter layers after the first GEM.

Applicant argues (two paragraphs on pg. 12 of remarks filed 12 December 2005) that the skilled artisan presumably would employ a functionally equivalent and structurally simpler three-layer structure. Examiner respectfully disagrees. First it is noted that Danielsson *et al.* expressly claims this three-layer structure (as discussed above). Further, Danielsson *et al.* state (column 1, lines 53-59) that "The converter is usually made as a thin plate of some heavy metal like copper or iron, but molybdenum, chromium or tungsten are equally suitable. In principle any material could be used, but the efficiency of the device will increase with increasing atomic number. Thus, an

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atomic number greater than 20 is preferable". In addition, Sauli states (column 20, lines 53-68) that "a demonstrated operation with gain in pure and inert gases which actually proved harmless to photocathode materials, and the existence of photocathode materials operating in many particular wavelengths either visible or invisible ones that have large quantum efficiency and long survivability in a gaseous environment". Thus both Danielsson *et al.* and Sauli suggest selecting the converter material depending on desired device properties such as efficiency. The combination of Danielsson *et al.* and Sauli would have suggested to the skilled artisan the advantage of selecting a converter material independent of a selected conductor material. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to select the converter material independent of the selected first and second conductive layer material in the detector of Sauli, in order to achieve desired device properties.

Conclusion

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shun Lee whose telephone number is (571) 272-2439. The examiner can normally be reached on Tuesday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached on (571) 272-2444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SL


CONSTANTINE HANNAHER
PRIMARY EXAMINER